The Mechanical Behavior Analysis and Optimal Design of Laminated Composite Shells

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ABSTRACT

Using the composite material to replace the metal material is the tendency of industry nowadays. Analysis the mechanical behavior of the composite shell structure is most important. The finite element methods of the shells are based of the 3D shell element was developed for the optimal design and analysis of the strength with the composite cylindrical shell and spherical shell. This element takes into account transverse shear strains and normal strain. In the part of optimal design, the minimum displacement under loadings for object function, layer group thickness and fiber angles of laminate are the design variable. The optimization method which include the Particle Swarm Optimization (PSO), Double Genetic Algorithm (DGA), Hybrid Particle Swarm Optimization (HPSO) to find the optimal result.

Keywords : Finite Element Methods ; Shell ; Particle Swarm Optimal ; Double Genetic Algorithm ; Hybrid Particle Swarm Optimization

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